



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,741	12/16/2003	Jeong-Hee Lee	030681-609	3660
21839	7590	08/05/2005		EXAMINER
BUCHANAN INGERSOLL PC (INCLUDING BURNS, DOANE, SWECKER & MATHIS) POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404				DONG, DALEI
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 08/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/735,741	LEE ET AL.
	Examiner	Art Unit
	Dalei Dong	2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 16 December 2003.  
2a)  This action is **FINAL**.                            2b)  This action is non-final.  
3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4)  Claim(s) 1-43 is/are pending in the application.  
4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.  
5)  Claim(s) 7-43 is/are allowed.  
6)  Claim(s) \_\_\_\_\_ is/are rejected.  
7)  Claim(s) \_\_\_\_\_ is/are objected to.  
8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on 16 December 2003 is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/27/2005.

4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5)  Notice of Informal Patent Application (PTO-152)  
6)  Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 1-6 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on July 21, 2005.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Specification***

3. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Method of Manufacturing a Field Emission Device Utilizing the Sacrificial Layer.

*Allowable Subject Matter*

5. Claims 7-43 are allowed.
6. The following is an examiner's statement of reasons for allowance:

Regarding to independent claim 1, prior art of record taken alone or in combination fails to teach or suggest a method of manufacturing a field emission device, the method of comprising: forming a sacrificial layer on the surface of the substrate structure and on an inner wall of the through hole other than the cathode electrode exposed to the bottom of the through hole; and performing lift-off for removing the sacrificial layer formed on the surface of the gate electrode and on an inner wall of the through hole using an etchant and forming an emitter formed of the resistive material

layer and the electron emission material layer formed on the resistive material layer in an inner portion of the through hole, in combination with other claimed features of the present claimed invention.

Regarding to independent claim 14, prior art of record taken alone or in combination fails to teach or suggest a method of manufacturing a field emission device, the method of comprising: forming a sacrificial layer on the surface of the substrate structure and on an inner wall of the through hole other than the cathode electrode exposed to the bottom of the through hole; and performing lift-off for removing the sacrificial layer formed on the surface of the gate electrode and on an inner wall of the through hole using an etchant, removing the resistive material layer formed on the sacrificial layer and the electron emission material, and forming an emitter formed of the resistive material layer and the electron emission material layer in an inner portion of the through hole, in combination with other claimed features of the present claimed invention.

Regarding to independent claim 24, prior art of record taken alone or in combination fails to teach or suggest a method of manufacturing a field emission device, the method of comprising: forming a sacrificial layer on the surface of the substrate structure and on an inner wall of the through hole other than the cathode electrode exposed to the bottom of the through hole; forming an isolation layer that isolates the sacrificial layer and a resistive material layer formed on the sacrificial layer from each

other and does not react to at least one of the sacrificial layer and the resistive material layer; and performing lift-off for removing the sacrificial layer formed on the surface of the gate electrode and on an inner wall of the through hole using an etchant, removing the isolation layer formed on the sacrificial layer, the resistive material layer, and the electron emission material, and forming an emitter formed of the resistive material layer and the electron emission material layer formed on the resistive material layer in an inner portion of the through hole, in combination with other claimed features of the present claimed invention.

Regarding to independent claim 34, prior art of record taken alone or in combination fails to teach or suggest a method of manufacturing a field emission device, the method of comprising: forming a sacrificial layer on the surface of the substrate structure and on an inner wall of the through hole other than the cathode electrode exposed to the bottom of the through hole; forming an isolation layer that isolates the sacrificial layer and a resistive material layer formed on the sacrificial layer from each other and does not react to at least one of the resistive material layer and the electron emission material layer; and performing lift-off for removing the sacrificial layer formed on the surface of the gate electrode and on an inner wall of the through hole using an etchant, removing the isolation layer formed on the sacrificial layer, the resistive material layer, and the electron emission material, and forming an emitter formed of the resistive material layer and the electron emission material layer formed on the resistive material

layer in an inner portion of the through hole, in combination with other claimed features of the present claimed invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of a method of manufacturing a field emission device.

U.S. Patent No. 5,769,679 to Park.

U.S. Patent No. 6,084,245 to Hsu.

U.S. Patent No. 6,096,570 to Hattori.

U.S. Patent No. 6,168,491 to Hsu.

U.S. Patent No. 6,297,587 to Kikuchi.

U.S. Patent No. 6,440,763 to Hsu.

U.S. Patent No. 6,465,941 to Kubota.

U.S. Patent No. 6,815,238 to Lee.

U.S. Patent No. 6,819,041 to Kajiwara.

8. This application is in condition for allowance except for the following formal matters:

The title being and the content of the abstract is not descriptive of the invention.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571)272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



D.D.

August 2, 2005



Joseph Williams  
Primary Examiner  
Art Unit 2879